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10/080,933	02/22/2002	Jianzhong Zhang	59864.00665	6502

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SQUIRE, SANDERS & DEMPSEY L.L.P.
8000 TOWERS CRESCENT DRIVE
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VIENNA, VA 22182-6212

EXAMINER
CORRIELUS, JEAN B

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
	10/080,933	ZHANG ET AL.
Office Action Summary	Examiner	Art Unit	
	Jean B. Corrielus	2611	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3/19/09*.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21,23-28,30-33,36-38,40-42,46 and 47* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21,23-28, 30-33,36-38, and 40-42, 46-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 August 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All b)☐ Some * c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)	5) ☐ Notice of Informal Patent Application
Paper No(s)/Mail Date. _____	6) ☐ Other: _____

DETAILED ACTION

Drawings

1.   The drawings are objected to under 37 CFR 1.83(a) because they fail to show a

signal input from the signal estimator to the "joint optimizer", shown in fig. 3, as

described in the specification page 12, lines 7-8 and fig. 23. as evidence by fig. 2, the

signal optimizer is configured to receive an input from the channel estimator. In

addition, fig. 3 is the expanded view of elements 74 and 56/58 shown in fig. 2. Fig. 2

only shows signals 82 and 84 feeding components 56/58 while fig. 3 shows signals __53__,

82 and 84 feeding circuit 56/58. In other words, base fig. 2 does not show any signal

"53" being provided to circuit 56/58. Any structural detail that is essential for a proper

understanding of the disclosed invention should be shown in the drawing. MPEP §

608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required

in reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure

is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next

Office action. The objection to the drawings will not be held in abeyance.

2.   The drawings were received on 3/19/09. These drawings are not acceptable. for

the reasons set forth above. In addition, Optimizer should be labeled as "74" as oppose

to "72".

Claim Objections

3.   Claims 38, and 40-42 are objected to as follow. Claim 38 recites the feedback

filtering means for **<u>filtering optimized values</u>** and summed output from the optimizing

means and the summing means. However, it is noted per the disclosure, at least page

13, the feedback filtering means does not filter the **<u>optimized values</u>**, rather it uses

such values to set the tap coefficients (filter characteristics). In addition, the feedback

filter is not disclosed to filter the summed output from the summing means it receives

rather the maximum likelihood values from the MLSE device. Note that if correction is

not made in the next office action, a potential 112 first paragraph rejection may exist.

Examiner's comment

4.   Note that claims 38, 40-42 recite means plus function limitations and effectively

invoke 112 sixth paragraph. The claims are treated as such.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by
> another filed in the United States before the invention by the applicant for patent or (2) a patent
> granted on an application for patent by another filed in the United States before the invention by the
> applicant for patent, except that an international application filed under the treaty defined in section
> 351(a) shall have the effects for purposes of this subsection of an application filed in the United States
> only if the international application designated the United States and was published under Article 21(2)
> of such treaty in the English language.

6.   Claims 21, 23-26, 28, 30, 38, 40-42 and 46-47 are rejected under 35

U.S.C. 102(e) as being anticipated by Zangi et al US patent No. 6,775,322 et al.

As per claim 21, Zangi et al teaches a receiving station (figs. 1 and 3) comprising

a signal filter see col. 3, lines 47-50 inherently in communication with a signal receiving

antenna (note fig. 1 is described by Zangi as see col. 3, lines 29-30, as a mobile station

therefore it has to include an antenna); a signal estimator 122 in communication with the

signal filter see col. 4, lines 57-60; circuit (124) corresponding to the claimed (signal

optimizer) configured to generate tap coefficients (optimized values) for the signal from

the signal filter ; a prefilter 102 configured to filter the signal from the signal filter using

the generated tap coefficients (optimized values) for the signal see col. 4, lines 59-61;

circuits (104, 106 and 108) considered as the claimed "decision feedback sequence

estimator" to receive the coefficients (optimized values) note input to filter 104, circuit

blocks (104, 106 and 108) "decision feedback sequence estimator" comprising a

summing element 106, a feedback filter 104 and a maximum likelihood sequence

estimator 108, see col. 11, lines 9-12, as shown in fig. 3, Zangi teaches that the

summing element 106, the feedback filter 104 and the MLSE 108 are operatively

connected to one another and further connected to prefilter 102. Note that the

interconnection of the prefilter 102r, the feedback filter 104, the MLSE 108 and the

summing element 106 cooperatively operate to permit inherently concurrent

interference and prefilter operation to be performed because there is no structural

difference between the Zangi's disclosed features of prefilter, the feedback filter, the

MLSE and the summing element and the applicant claimed features of "prefilter, the

feedback filter, the MLSE and the summing element".

As per claim 23, Zangi et al teaches that the output of the decision device

(MLSE) 108 is configured to transmit generated maximum likelihood values through an

output to the feedback filter 104 and the input of the decision device (MLSE) 108 is

configured to receive summed values from the summing element 106.

As per claim 24, Zangi et al teaches the feedback filter 104 comprises a first

input in communication with circuit 124 (signal optimizer) and configure to receive the

optimized values from the circuit 124 (signal optimizer) and a second input configured

to receive the generated maximum likelihood values from the MLSE 108.

As per claim 25, Zangi et al further teaches the summing element 106 receives

inputs from prefilter 102 and the feedback filter 104 and sends a summed output to the

MLSE device 108.

As per claim 26, the signal filter see col. 3, lines 47-50 is located in the forward

path of the receiving station hence it has to be a feedforward filter.

As per claim 28, Zangi further teaches that the feedback filter 104 receives optimized signals from the signal optimizer 124 that are used to define filter characteristics of the feedback filter 104 see col. 4, lines 57-60.

As per claim 30, the signal filter see col. 3, lines 47-50 and the signal estimator 122 is placed in the received chain of the receiving station see fig. 1.

As per claim 38, Zangi et al teaches a receiving station (fig. 1 and 3) comprising see col. 3, lines 47-50 inherently in communication with a signal receiving antenna (note fig. 1 is described by Zangi as see col. 3, lines 29-30, as a mobile station therefore it has to include an antenna); a signal estimating means 122 for estimating channel operations of the signal from the signal filtering means; means 124 corresponding to the claimed signal optimizing means in communication with the signal filtering means for generating coefficients (optimized values); prefiltering means 102 for filtering the signal from the signal filtering means using the generated coefficients (optimized values) means (104, 106 and 108) considered as the claimed "interference cancellation means" for receiving the coefficients (optimized values) to perform concurrent interference and prefilter operations; Zangi further teaches that means (104, 106 and 108) (interference canceling means) comprises summing means 106 for summing inputs from the prefiltering means 102; feedback filtering means 104 for receiving coefficients (optimized values) and a summed values output signal from the signal optimizing means (124) and the summing means 106, respectively; MLSE means 108 for generating maximum values from the summing means 106. Note that the interconnection of the prefiltering means 102, the feedback filtering means 104, the

MLSE means 108 and the summing means 106 cooperatively operate to permit

inherently concurrent interference and prefilter operation to be performed because there

is no structural difference between the Zangi's claimed features of prefiltering means,

the feedback filtering means, the MLSE means and the summing means and the

applicant claimed features of "prefiltering means , the feedback filtering means, the

MLSE means and the summing means.

As per claim 40 see claim 23.

As per claim 41 see claim 24.

As per claim 42, Zangi et al further teaches the summing element 106 receives

inputs from prefilter 102 and the feedback filter 104 and sends a summed output to the

MLSE device 108 and an output of the MLSE being an output from the receiving station

see fig. 3.

As per claim 46 the apparatus is a mobile communication device. See col. 3,

lines 29-30.

As per claim 47 the device is inherently an integrated circuit because mobile

communication devices uses IC circuit.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

8.   Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et

al US patent No. 6,775,322 et al. in view of Taylor US Patent Application No.

2002/0197987.

        As per claim 27, as applied to claim 25 above, Zangi et al teaches every feature

of the claimed invention but does not explicitly teach the further limitation of a

deinterleaver in communication with an output of the MLSE estimator and depuncture in

communication with a deinterleaver and a channel decoder in communication with the

deinterleaver. Taylor et al teaches a deinterleaver 58 in communication with an output

of the MLSE estimator (i.e. output of demodulator/equalizer 56) and depuncture 62 in

communication with a deinterleaver 58 and a channel decoder 64 in communication

with the deinterleaver 58. It would have been obvious to one skill in the art to

incorporate such a teaching in Zangi et al in order to recover the originally transmitted

signal.

9.   Claims 31-33 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Zangi et al US patent No. 6,775,322 in view of Malkemes et al US Patent

Application publication S/N US2002/0106040 A1.

        As per claim 31, as applied to claim 30 above, Zangi et al teaches every feature

of the claimed invention but does not explicitly teach that the receiving station

comprises a plurality of receive chains that corresponds to a plurality of signal receiving

antennas configured to receive and transmit a plurality of signal vector to the plurality of

receive chains. Malkemes et al teaches the receiving station (fig. 1) comprises a

plurality of receive chains see fig. 1) that corresponds to a plurality of signal receiving

antennas 102 configured to receive and transmit a plurality of signal vector to the

plurality of receive chains. Given that fact, it would have been obvious to one skill in the

art to incorporate such a teaching in Zangi et al in order to improve signal detection

since the system would have been able to be configured to receive multiple copies so

that existence of signal error can be easily determined.

As per claim 32, see claim 31. In addition, Zangi teaches transmitting the

coefficients (optimized feed forward filter parameters and the optimized feedback filter

parameters) to a decision feedback sequence estimator (104, 106 and 108), wherein

the decision feedback sequence estimator (104, 106 and 108) comprises a feedback

filter 104: note that the limitation "simultaneously" is interpreted as "both". Clearly Zangi

teaches that "both" interference cancellation and prefiltering operations are performed

via the feedforward filter 102 and the feedback filter 104. see col. 4, lines 43-50. In

addition, for the sake of argument, note that the prefiltered signal from feedforward filter

102 is provided as input to the summer 106 at the same time as the ISI compensated

signal generated by feedback filter 104 (see col. 7, lines 15-21) another indication that

the prefilter and ISI compensation are performed simultaneously.

As per claim 33, Zangi et al further teaches the feedforward filter 102 filters the

data vector and transmitting a feedforward output to a summing element 106; receiving

an output of the summing element in a MLSE device 108 and generating an output of

that is transmitted to an input of the feedback filter 104 and subsequent component and

filtering the output received from the MSLE device in the feedback filter 104 and

transmitting a filtered signal to the summing element 106.

As per claim 36, Zangi further teaches the received chain comprises a receiving
filter see col. 3, lines 47-50 inherently in communication with a signal receiving antenna
(note fig. 1 is described by Zangi as see col. 3, lines 29-30, as a mobile station therefore
it has to include an antenna); a channel estimator 122 in communication with the
receiving filter; the channel estimator 122 in communication with circuit 124
corresponding to the claimed signal optimizer configured to optimized feedforward and
feedback filter parameters see col. 5, lines 1-27.

10.   Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et
al US patent No. 6,775,322 in view of Malkemes et al US Patent Application publication
S/N US2002/0106040 A1 and further in view of Taylor US Patent Application No.
2002/0197987.

As per claim 37, as applied to claim 33 above, Zangi et al and Malkemes et al
teach every feature of the claimed invention but do not explicitly teach the further
limitation of a deinterleaver in communication with an output of the MLSE estimator and
depuncture in communication with a deinterleaver and a channel decoder in
communication with the deinterleaver. Taylor et al teaches a deinterleaver 58 in
communication with an output of the MLSE estimator (i.e. output of
demodulator/equalizer 56) and depuncture 62 in communication with a deinterleaver 58
and a channel decoder 64 in communication with the deinterleaver 58. It would have
been obvious to one skill in the art to incorporate such a teaching in Zangi et al and
Malkemes in order to recover the originally transmitted signal.

Response to Arguments

11.   Applicant's arguments filed 3/19/09 have been fully considered but they are not

persuasive. it is alleged that four separate structural elements are claimed while zangi

only teaches three structural elements. This is inaccurate. Examiner maintains that at

least Fig. 3 of Zangi shows the corresponding claim features. As shown in the diagram

below, each of applicant's claimed feature, shown, for instance in fig. 2, corresponds

one to one to each of Zangi's components shown at least in fig. 3. The DFSE circuit of

Zangi (see diagram below) , corresponding to applicant's claimed limitation "DFSE",

includes a summer 106, a feedback filter 104 and a maximum likelihood sequence

estimator 108. in addition, the adaptive algorithm 124 of zangi corresponds to signal

optimizer, shown in applicant's fig. 2, as block 74. Zangi further teaches a channel

estimator 122, shown in applicant's fig. 2 as 54. Zangi teaches a prefilter 102

corresponding to applicant's circuit block 56 depicted in fig. 2. Since Zangi teaches

every feature of the claimed invention, i.e., structurally and functionnaly, as depicted in

the above rejection, and further, as shown in the mapping below, zangi anticipates the

claimed invention.
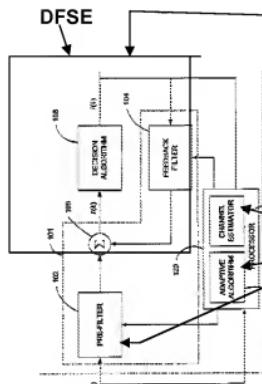
Zangi's Fig. 3　　　　　　　　　　　　　　　　**Fig.2 of current Application**

DFSE
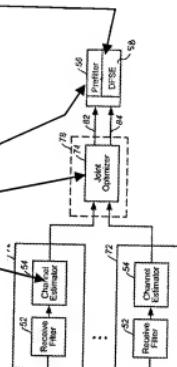
Applicant's argument(s) with respect to the Taylor's and Makemes' references is moot since the limitations allegedly missing in Zangi et al are in fact present, as set forth in the above comment and rejection.

With respect to the drawing, applicant stated that replacement sheet corrects the defficiencies noted in the outstanding drawing objection. However, the changes noted in the comment are not in the drawing (replacement sheet). Fig. 3 only shows the output of the optimizer being provided to the prefilter and DFSE 56/58. However, fig. 3 shows a signal 53 being provided to the prefilter. This not consistent with fig. 2.

With respect to the claim objection, applicant's argues that the specification page 13, lines 5-8 teaches feedback filter 92 operates to filter the optimized value provided thereto on line 60 and generate filtered values on line 96. However, examiner

notes that the signal on line 60 of fig. 3 is not the optimized values rather the output of

circuit 102. The optimized values are provided rather on line 84 to feedback filter 92,

i.e. output of optimizer 74. The specification page 13, lines 14-16, clearly teaches the

characteristics of the feedback filter 92 is defined by the **optimized values** provided

on line 84. Such section of the disclosure, however, does not teach that the **optimized**

values presented in line 84 **are filtered by filter 92**, as presently, recited in claim 38. In

addition, examiner notes that the signal on **line 60** provided to the feedback filter 92 is

based on the output of the summer but such signal is **not the summed output** as

presently recited in claim 38.

Conclusion

12.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

        A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Monday-Thursday from 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jean B Corrielus/
Primary Examiner
Art Unit 2611